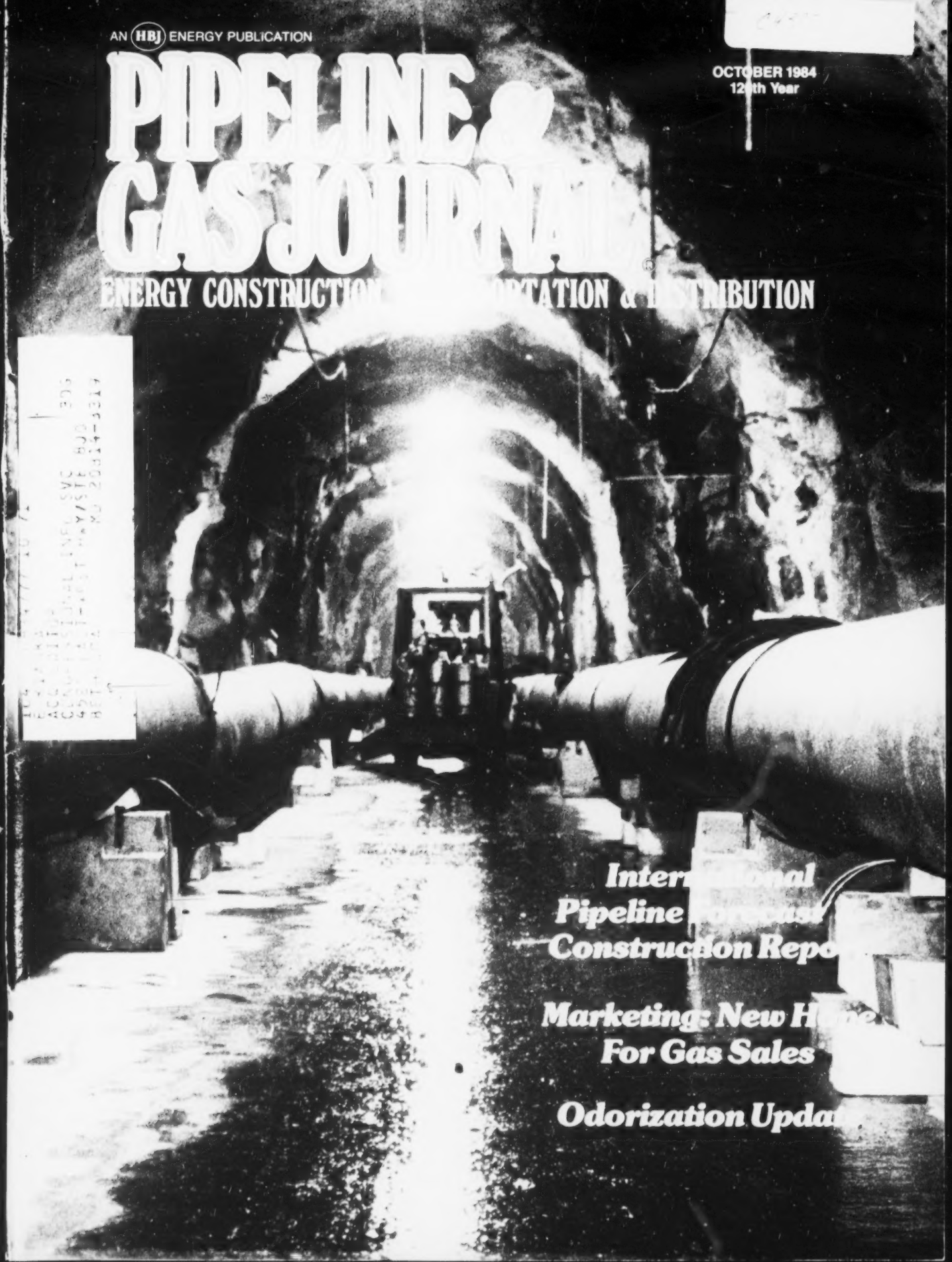
AN (HBJ) ENERGY PUBLICATION

PIPELINE & GAS JOURNAL

OCTOBER 1984
12[illegible]th Year

ENERGY CONSTRUCTION [illegible]ORTATION & [illegible]TRIBUTION



International Pipeline [illegible] Construction Repo[illegible]

Marketing: New H[illegible] For Gas Sales

Odorization Upda[illegible]

PIPELINE & GAS JOURNAL

Published continuously since 1859

October 1984 • Volume 211 • Number 12

International Pipeline & Gas Utility Design, Construction & Operation

Natural gas from the Norwegian sector of the North Sea comes ashore at Karstø in tunnel in the Statpipe gas line from Statfjord Field. The gas is processed and gas liquids removed, then sent on its way to Ekofisk platforms in the southern part of the North Sea through a compahion pipeline, which goes back to sea through the same tunnel. Cut through solid rock, tunnel takes place of conventional buried landfall. – *photo courtesy NACAP.*

ON THE COVER

There are 101,577 miles of planned and underway crude oil, refined products, NGL, LPG, and natural gas pipelines around the world, outside the U.S. During 1984, contractors will install 12,353 miles of pipelines internationally. For 1985, the forecast is for 12,500 miles or more. Special report, page 16, provides details and both area-by-area and country-by-country breakdowns.

IN THIS ISSUE

Getting ready for winter is a year-around job for the nation's gas distribution utilities and gas transmission pipelines. It involves both planned maintenance/renovation/replacement and tasks that result from last winter's operations. In November, special reports from gas companies deeply involved in "winterization" tell how it's done and how to do it, complete with checklists.

NEXT MONTH

1 Newsreel
Highlights of month's news

6 Government Guidelines
State and Federal regulatory notline

8 MCF
Industry news/developments

10 Projects
New systems/expansions/developments

14 Marketing's The Answer
Chairmen of American Gas Association and the Gas Appliance Manufacturers Association insist a return to selling gas service and appliances is essential.

16 International Pipeline Forecast
Area-by-area, country-by-country examination of where tomorrow's pipelines are being planned and built around the globe, outside the U.S.

24 Scottish Products Line
New natural gas liquids pipeline from St. Fergus to Mossmorran on east coast of Scotland was carefully planned and installed.

30 Bangladesh Gas Line
Gas supplies for new distribution systems now moving through recently completed transmission line; other projects underway.

33 Saudi Arabia Offshore Lines
Offshore Marjan Field pipeline project features new method of foam-filled joints for concrete-coated pipe.

38 Odorization Update
Today's odorants are excellent, say experts; but industry needs to use increased levels to ensure safety.

48 Measurement Report
Changing from charts to computers makes sense when a little dirt or a bad chart can cost thousands of dollars.

54 Porta Processor
The traditional meter reader's book is being replaced by a minicomputer. By late 1985, the unit will be standard equipment throughout Columbia Gas' territory.

62 People
Action makers on the move

68 Energy Bookshelf
Good reading ahead

72 Meetings
Where it's happening

73 Products
New materials/equipment/services

80 Advertisers Index

101,577 Miles Of Pipelines Planned Or Underway

International Pipelines

SPECIAL REPORT
by DEAN HALE, Editor

International pipeline construction activity in 1985 should be equal to or better than 1984, a year when a total of 12,325 miles of crude oil, products, gas liquids, and natural gas pipelines will be installed worldwide.

The 1984 global pipeline construction figures (all areas outside the U.S.) include 7,851 miles of gas pipelines; 2,381 miles of crude oil pipelines; 1,435 miles of refined products, LPG, and NGL pipelines; and 658 miles of offshore oil and gas pipelines.

As of October 1, 1984 there were 101,577 miles of planned and underway pipelines internationally. This includes 70,861 miles of planned and underway natural gas pipelines; 18,263 miles of planned and under construction crude oil lines; 9,893 miles of planned and being built products, LPG, and gas liquids pipelines; 2,246 miles of slurried solids lines, and 324 miles of carbon dioxide pipelines.

Of the total pipelines underway or planned, 17% are in Europe; 17% are in South America; 14% are in the Eastern Bloc, China, or U.S.S.R.; 13% are in Africa; 12% are in the Middle East; 9% are in Canada; 9% are in Southeast Asia; 4% are in Australia and New Zealand; 3% are in Mexico and Central America, and 2% are in the Pacific Area that includes Japan, Korea, Taiwan, and the Philippines.

Early indications are that 12,500 miles of international pipelines will be installed during 1985. That figure, of course, can and probably will be altered by political and energy economics considerations.

Worldwide, economic conditions began improving during 1984 and demand for energy increased. Lesser developed countries are again seeking energy by pipeline, either from resources within their own borders or from nearby areas.

Political considerations in the Middle East have resulted in development of several major pipeline construction projects. Some could even be considered "super projects" based on their length, diameter, and estimated cost.

Several big projects reached the completion stage in 1984, including the Norwegian Statpipe system in the North Sea, where pipelaying was finished early in the summer ahead of schedule; completion in early 1984 of the 926-mile Dampier- to-Perth gas pipeline in Western Australia (the line is now being filled for operation); and completion of a 42-in. section of the Trans-Med Gas Pipeline from near Rome to Minerbio in northern Italy.

Of the 101,577 miles of planned and underway pipelines around the globe, 86% are in countries in the free world.

Of the more than 85,000 miles of free world underway and planned lines, 72% are natural gas, 17% are crude oil, and 11% are products lines.

Planned lines account for 90% of the total; 10% are under construction.

Of the lines under construction, 68%

INTERNATIONAL PIPELINE CONSTRUCTION*

(As of October 1, 1984)

	Miles		
Type of Line	Total	Underway	Planned
Natural Gas	70,861	8,162	62,699
Crude Oil	18,263	2,304	15,959
Products	9,893	1,614	8,279
Slurry	2,246	5	2,241
Carbon Dioxide	324	0	324
TOTALS	101,577	12,085	89,492

**Includes all free world (outside U.S) plus Soviet Bloc and China*

1984 International Pipeline Construction

(Estimated Miles Completed During 1984)

Gas Transmission	6,751
Gas Field and Gathering Lines	1,100
TOTAL	7,851
Crude Trunk Lines	1,771
Crude Gathering Lines	610
TOTAL	2,381
Products Lines	615
NGL,LPG Lines	820
TOTAL	1,435
Offshore Gas Lines	498
Offshore Oil Lines	160
TOTAL	658
GRAND TOTAL	12,325

THE WORLD PIPELINE OUTLOOK

Planned or Under Construction Projects
(As of October 1, 1984)

In Miles

	GAS PIPELINES		CRUDE PIPELINES		PRODUCTS PIPLINES		TOTALS		
	Planned	U/C	Planned	U/C	Planned	U/C	Planned	U/C	Total
Canada	8,211	230	65	431	155	145	8,431	806	9,237
Europe & North Sea	14,402	1,855	597	48	84	89	15,083	19,921	17,075
Middle East	4,836	189	4,076	410	2,238	—	11,150	599	11,749
Africa	5,259	1,090	2,299	1,001	1,910	935	9,468	3,026	12,494
S.E. Asia	6,647	419	1,429	—	767	100	8,843	519	9,362
Australia, N. Zealand	3,072	128	280	—	227	—	3,579	128	3,707
Mexico & Cent. Amer	624	392	804	—	784	175	2,212	567	2,779
South America	12,353	584	2,355	—	1,289	170	15,997	754	16,751
Pacific	1,240	—	454	—	440	—	2,144	—	2,144
U.S.S.R. East Bloc & China	6,055	3,275	3,600	414	375	—	10,030	3,689	13,719
TOTALS	62,699	8,162	15,959	2,304	8,279	1,614	86,927	12,080	99,007

are gas pipelines, 19% are crude oil lines, and 13% are products lines.

Of the total planned, 73% are natural gas, 18% are crude oil, and 9% are products lines.

Major Projects. Big pipeline projects make news and there has been a lot of activity in recent months.

A major study of Europe's energy requirements and natural gas supplies from now to the end of the century was made by Purvin & Gertz, consulting energy engineers. The P&G study found that from 1984 to 1990, there will be an excess of supply over demand.

By 1995, a shortfall of 42 million tons of oil equivalent (MTOE) can be expected, and that will increase to 86 MTOE by the year 2000. P&G believes the shortfall will be covered by increased western Europe gas production and additional gas from the North Sea in the early stages, and by increased imports from Algeria, U.S.S.R., and Libya in the 1995 to 2000 period. P&G does not believe that gas from Nigeria or the Middle East will be piped to Europe.

Eastern Bloc countries suffering from reduced oil exports from Russia may eventually be compensated with more natural gas from Soviet pipelines. The U.S.S.R. recently made such a proposal to its satellites. The Soviet Union also has announced plans to triple gas deliveries to Finland, reaching 106 Bcf by the century's end.

Loop of the Algerian section of the 1,563-mile Trans-Med gas pipeline to and through Italy has been announced by Algeria's Sonatrach. A letter of intent on 342-miles of 48-in. parallel line in Algeria has been given to Saipem.

Now that Norway's Statoil is getting ready to commission (by year's end) the Statpipe system in the North Sea, it is looking at alternatives to moving gas from the far, far northern Askeladden Field on Tromsoflaket where 6.18 Tcf has been found. Statoil says more gas needs to be found there to supply a major pipeline (south through Sweden) to the continent. (At 1 Bcf per day, the field now could supply a pipeline for 16.9 years.)

Statoil is studying the possibility of liquefying the gas and transporting it as LNG in tankers to the continent or even to the U.S.

Canada's energy posture is expected to improve materially with a newly elected government that has suggested it will stress development of oil and gas re-

In Iran, Saipem is completing work on the IGAT II gas pipelines. Scheduled finish date is February 1985, seven years after project was begun (March 1978).

In Canada, Arctic trenchers on Norman Wells oil pipeline could cut up to 5 miles/day in muskeg, but met their match in boulder-filled permafrost of northern spreads.

In Auckland, N.Z., products and natural gas pipelines were laid in the same trench under city streets as part of recent project.

sources and export of same to stimulate income. Coupled to that are two recent and important announcements – one by the Polar Gas Project on a new 1,340-mile, 36-in. pipeline route from the Mackenzie Delta and the Beaufort Sea to Alberta; the other is a recommendation by an environmental assessment commission that a 16-in. crude oil line might be built to take up to 100,000 b/d of oil from the Beaufort Sea area to southern markets.

European developments. British Gas Corp. plans to install 48 miles of 24-in. and 35 miles of 42-in. in 1985, plus numerous other smaller projects not yet formalized.

Denmark's Dansk Olie & Natur Gas (DONG) plans 104 miles of 12-, 16-, and 20-in. pipeline. Work on 7,000 miles of gas distribution laterals is getting underway by Denmark's five regional gas distribution organizations.

In France, Gaz de France reportedly will install 88 miles of 18- to 30-in. in early 1985.

In West Germany, work is progressing on 273 miles of 44-in. gas lines for the MEGAL system. Another 52 miles are scheduled to get underway in 1985.

In Sweden, 186 miles of 24- and 36-in. gas pipeline are planned from Malmo to Halsted.

Spain abounds with plans for gas pipelines – some 1,770 miles are projected and nearly every area of the country is covered.

Africa. Work on the White Nile pipeline project, dual 935-mile lines – one a 10- and 12-in. products line, the other a 20- and 22-in. crude oil line – has partially resumed with right-of-way clearing. If rebel unrest is contained by government forces, construction of the pipeline might get underway in early 1985.

Details on the proposed Trans-Africa Pipeline Project, 2,299 miles of 36-in. crude oil pipeline across the middle of Africa, continue to leak out. Line's oil would come from the terminal at Yanbu al Bahr in Saudi Arabia, transported by ship

WORLD PIPELINES – PLANNED AND UNDER CONSTRUCTION – BY COUNTRY

(As of October 1, 1984)

In Miles

	Gas Pipelines		Crude Pipelines		Products Pipelines		Country Totals		
	Planned	U/C	Planned	U/C	Planned	U/C	Planned	U/C	Total
Abu Dhabi	200	—	200	—	—	—	400	—	400
Algeria	1,465	459	—	—	—	—	1,589	459	2,048
Argentina	5,493	393	435	—	392	—	6320	393	6,713
Australia	2,891	—	248	—	227	—	3,366	—	3,366
Austria	240	—	—	—	—	—	240	—	240
Bangladesh	1,350	57	—	—	—	—	1,350	57	1,407
Belgium	16	21	—	—	—	—	16	21	37
Bolivia	1,437	—	—	—	405	—	1,842	—	1,842
Brazil	3,818	191	517	—	—	—	4,335	191	4,526
Bulgaria	—	—	—	—	—	—	—	—	—
Burma	50	—	—	—	—	—	50	—	50
Cameroon	—	—	2,299	—	—	—	2,299	—	2,299
Canada	8,211	230	65	431	155	145	8,431	806	9,237
Chad	—	—	—	—	—	—	—	—	—
Chile	424	—	—	—	168	—	582	—	582
China	1,875	331	2,725	174	375	—	4,975	505	5,480
Colombia	360	—	590	—	—	170	950	170	1,120
Congo	—	—	—	—	—	—	—	—	—
Costa Rica	—	—	110	—	—	—	110	—	110
Czechoslovakia	—	528	—	—	—	—	—	528	528
Denmark	7,651	—	—	—	—	—	7,651	—	7,651
Dubai	—	—	—	—	—	—	—	—	—
E. Germany	—	—	—	—	—	—	—	—	—
Ecuador	135	—	286	—	324	—	745	—	745
Egypt	536	277	—	66	—	—	536	343	879
France	1,015	—	350	—	—	—	1,365	—	1,365
Greece	115	—	—	—	—	—	115	—	115
Guatemala	—	—	200	—	—	—	200	—	200
Honduras	—	—	160	—	—	—	160	—	160
Hungary	372	—	—	—	—	—	372	—	372
India	1,440	135	342	—	336	—	2,118	235	2,353
Indonesia	1,891	—	121	—	—	—	2,012	—	2,012
Iran	(n.a.)								
Iraq	2,100	—	1,955	—	685	—	4,740	—	4,740
Ireland	170	—	—	—	—	—	170	—	—
Italy	333	1,447	—	48	—	—	333	1,495	1,828
Ivory Coast	—	—	—	—	—	—	—	—	—
Japan	1,080	—	—	—	10	—	1,090	—	1,090
Kenya	—	—	—	—	260	—	—	260	260

(Continued)

Through the bog in old Kauri forest in New Zealand, the products and gas lines were covered with slats to protect against buried logs and roots.

across the Red Sea to Port Sudan, then by pipeline across Sudan, the Central African Republic, and Cameroon, to a port at Douala. Cost is estimated at $10 billion.

Work on Nigeria's Escravos-Lagos pipeline project is expected to get underway in early 1985. Snamprogetti is doing survey and design work on the 216-mile, 36-in. gas line. Sister company Saipem has contract for construction.

Australia. Natural gas may come to Darwin on the north coast as result of ambitious plans to transport the fuel from the Amadeus Basin in Palm Valley. The 800-mile line would cost $250 million.

Middle East. Iraq is feverishly working on two plans to move its crude oil production to new ports to avoid the strife in the Arabian Gulf. Priority plan is for a 500-mile-plus line from Haditha, Iraq, to Aqaba, Jordan, that would initially handle 500,000 b/d. Cost would be $1 billion. Bechtel reportedly is designing and will supervise this line's construction.

A second proposed line would originate at Rumaila, Iraq, and run south to the Petromin Yanbu oil line. Eventually, from that junction point, Iraq would finance and build a parallel line to Yanbu. Cost would be $3 billion.

South America. In Colombia, contract has been let to Mannesman Anlagenbau AG and IMEG to build the $170-million, 184-mile crude oil line from Canon Lina field in northeastern Colombia across the Andes to Rio Zulia.

Brazil is completing its 254-mile Nordestao gas pipeline system in northeastern Brazil that will aid industrial development.

P&GJ

WORLD PIPELINES – PLANNED AND UNDER CONSTRUCTION – BY COUNTRY

(As of October 1, 1984)

In Miles

	Gas Pipelines		Crude Pipelines		Products Pipelines		Country Totals		
	Planned	U/C	Planned	U/C	Planned	U/C	Planned	U/C	Total
Korea	—	—	454	—	440	—	894	—	894
Kuwait	273	—	74	—	—	—	347	—	347
Libya	—	354	—	—	—	—	—	354	354
Malaysia	609	200	100	—	50	—	759	200	959
Mexico	624	392	334	—	703	175	1,661	567	2,228
Netherlands	404	27	247	—	15	—	666	27	693
New Zealand	181	128	32	—	—	—	213	128	341
Nigeria	2,786	—	—	—	—	—	2,786	—	2,786
Norway	128	—	—	—	—	—	128	—	128
North Yemen	—	—	—	—	236	—	236	—	236
Oman	399	—	968	130	—	—	1,367	130	1,497
Pakistan	985	—	540	—	—	—	1,525	—	1,525
Panama	—	—	—	—	81	—	81	—	81
Peru	—	—	373	—	—	—	373	—	373
Portugal	—	—	—	—	69	—	69	—	69
Qatar	—	—	—	—	41	—	41	—	41
Saudi Arabia	650	189	879	—	810	—	2,339	189	2,528
South Africa	—	—	—	—	93	—	93	—	93
Spain	1,770	—	—	—	—	89	1,770	89	1,859
Sri Lanka	—	—	10	—	20	—	30	—	30
Sudan	—	—	—	935	—	935	—	1,870	1,870
South Yemen	—	—	—	—	177	—	177	—	177
Sweden	1,286	65	—	—	—	—	1,286	65	1,351
Taiwan	160	—	—	—	—	—	160	—	160
Tanzania	—	—	—	—	678	—	678	—	678
Thailand	322	27	316	—	361	—	999	27	1,026
Tunisia	472	—	—	—	370	—	842	—	842
Turkey	1,090	—	—	280	125	—	1,215	280	1,495
U.K.	690	184	—	—	—	—	690	184	874
U.A.E.	124	—	—	—	164	—	288	—	288
U.S.S.R.	3,808	2,416	640	240	—	—	4,448	2,656	7,104
Uruguay	189	—	—	—	—	—	189	—	189
Venezuela	497	—	154	—	—	—	651	—	651
Vietnam	—	—	235	—	—	—	235	—	235
West Germany	584	111	—	—	—	—	584	111	695
Yugoslavia	—	—	—	—	—	—	—	—	—
Zaire	—	—	—	—	205	—	205	—	205
Zambia	—	—	—	—	—	—	—	—	—
Zimbabwe	—	—	—	180	—	—	—	180	180
TOTALS	62,699	8,162	15,959	2,304	8,279	1,614	86,927	12,080	99,007